

Title: Tile Style**Brief Overview:**

During five math periods, students will identify, create, and extend patterns. They will also identify pattern rules. As a culminating assessment, students will create a tile floor pattern that could be used in their school.

Links to NCTM 2000 Standards:

- **Standard 2: Patterns, Functions, and Algebra**
Students will demonstrate their ability to create and extend patterns using various concrete materials. They also will name pattern rules.
- **Standard 6: Problem Solving**
Students will demonstrate their ability to solve problems in mathematics by using their knowledge of patterns. The problem solving will focus on the use of manipulatives, cooperative learning, and the identification and use of patterns in authentic situations.
- **Standard 7: Reasoning and Proof**
Students will demonstrate their ability to use logical reasoning by identifying, describing, and creating patterns.
- **Standard 8: Communication**
Students will demonstrate their ability to communicate mathematically by using manipulatives, models, and pictures. They will communicate the mathematical language of patterns and relationships.
- **Standard 9: Connections**
Students will demonstrate their ability to connect mathematical principles with design and construction.
- **Standard 10: Representation**
Students will demonstrate their ability to represent mathematical principles by creating patterns that model real-world objects.

Links to National Science Education Standards

- **Life Science**
In the extension section, students may be given the opportunity to go on a nature walk to explore patterns in nature. In addition, students may use the beans from this learning unit to investigate sprout growth.

Grade/Level:

Grades 2-3

Duration/Length:

This unit will last approximately five math periods. Forty-five minutes to one hour will be needed each day.

Prerequisite Knowledge:

Students should have working knowledge of the following skill:

- Basic pattern recognition

Student Outcomes:

Students will be able to:

- identify patterns and pattern characteristics (pattern cores, etc.).
- extend and continue patterns.
- name pattern rules.

Materials/Resources/Printed Materials:

- Book: Know About Pattern, by Henry Pluckrose or Lots and Lots of Zebra Stripes, by Stephen Swinburne (or any other book that contains patterns)
- Connecting cubes
- Chart paper
- Markers, pencils, crayons, glue
- Pattern blocks (or Student Resource Sheet 1: Pattern Blocks)
- Blank sentence strips
- Sentence strips with various pattern block patterns (see Student Resource 2 for examples).
- Student Resource Sheet 2: Extending Patterns
- Student Resource Sheet 3: Graph Paper
- Student Resource Sheet 4: Vignette
- Student Resource Sheet 5: Student Self-Assessment.
- Teacher Resource Sheet 1: Scoring Tool
- Teacher Resource Sheet 2: Answer key
- Various types of beans
- Several packages of Fun Size M&M's.
- Possible materials for final assessment (index cards, Post-it Notes, tagboard, cardboard)

Development/Procedures:

Day One

- Motivation: Demonstrate clap/snap patterns (example: clap, snap, clap, snap, etc.). Have the students repeat the various patterns presented by the teacher. Through this activity, guide the students to identify the topic of the unit as “patterns.”
- Read a pattern book to the students (see materials list). Discuss the book with the students. Have the students “Think-Pair-Share” other patterns that they have observed in the world.
- Model patterns with two colors of connecting cubes. Have the students use two colors of connecting cubes to create their own patterns. Ask the students to trade their patterns with another student and extend them. Repeat the above procedure with three colors of connecting cubes.
- Have the students share their patterns with the class. Hold a class discussion on pattern characteristics. As a group, have students chart pattern characteristics. Include in your discussion a definition of the “core” of a pattern (The core is the smallest part of a pattern that repeats.).

- Have students create a pattern using connecting cubes. Next, have them identify the core of a partner's pattern.

Day Two

- Motivation: Show a connecting cube pattern. Have the students clap/snap the pattern (example: red, blue, red, blue).
- Provide the students with pattern blocks (Student Resource Sheet 1 could be used). Give them exploration time. Model how to create patterns using different shapes and colors. Have the students create patterns using the pattern blocks.
- Give the students sentence strips with incomplete shape/color patterns (See Student Resource Sheet 2 for examples.). Have the students extend the patterns found on the sentence strips. Share responses and have the students identify the core of each pattern on the sentence strips.
- Have the students complete Student Resource Sheet 2 (See Teacher Resource Sheet 2 for answers.).

Day Three

- Motivation: Invite students to the front of the room. Select a group of students to stand in a pattern formation (examples: boy, girl; hands up, hands down). Have students identify the core of the pattern.
- Invite another group of students to the front of the room. Direct them to create another pattern. Have the students identify the core of the pattern. Introduce the method of naming pattern rules (example: boy, girl, boy, girl = A B A B; girl, girl, boy, boy = A A B B).
- Assign the students to a cooperative learning group (approximately 4 students). Have each group create a pattern core using student attributes (example: hair color, height, clothing color, etc.). Have volunteers identify how the core was formed and name the pattern rule of the core (example: "I think they formed their core using hair color and the pattern rule is A B A B").
- Give the students different types of beans. Have them create and glue patterns with beans on sentence strips. On the back of the sentence strips have the students write the pattern rule. Ask the students to trade their sentence strips with a partner. Have the students extend the patterns using beans, and identify the pattern rules.

Day Four

- Motivation: Name a pattern rule (Example: A B B A). In cooperative groups, have the students take five minutes to create a pattern using that rule (example: the students could use paper, crayons, clapping/snapping, attributes, etc.).
- Hand out and read aloud the vignette (Student Resource Sheet 4). Provide the students with Student Resource Sheet 5 and Teacher Resource Sheet 1 (student and teacher scoring tools). Discuss the expectations. Have the students work with a partner to create a core and identify the pattern rule for their tile floor. Ask the students to use the graph paper (Student Resource Sheet 3) to draw a picture of their tile floor.

Day Five

- Motivation: Give cooperative groups a package of "Fun Size M&M's." Have them use the M&M's to create an A B B A pattern. At the end of the lesson, have the students eat the M&M's.

- Have the students work with their partners to create a model of their tile floor. Have them use their graph paper picture to create their model. Provide the students with various materials to create their tile floors (some suggestions are included in the materials section). Have the students mount their tiles on a large piece of cardboard or tagboard.
- Provide time for the students to review the scoring criteria, and to complete Student Resource Sheet 5 (self assessment).
- “Designer Showcase:” Have the students display their tile floor creations in their classroom or throughout the school. Invite other classes and family members to view the tile floors.

Performance Assessment:

- A new addition is going to be built at your school. The designer needs your help to create a pattern for the tile floor. Your class has been chosen to help with the design process. You will create a patterned tile floor. Don’t forget that the core of a pattern must repeat! We will have a “Designer Showcase” so that you may exhibit your “tile style!”
- See Student Resource Sheet 5 and Teacher Resource Sheet 1 for the student and teacher scoring tools.

Extension/Follow Up:

Science

- Have students go on a nature walk to identify patterns in nature.
- Have students use the beans from Day 3 to investigate plant growth (place the beans between wet paper towels and see which beans sprout).

Language Arts

- Have students write to inform by describing their tile patterns.
- Have students write a letter to persuade observers why their pattern should be used to create a tile floor.

Math

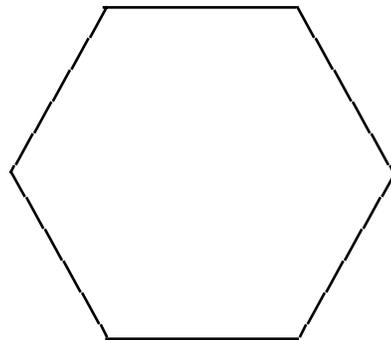
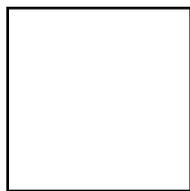
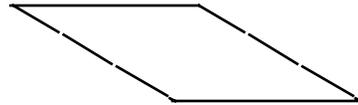
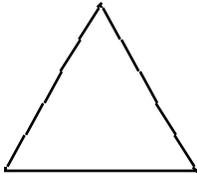
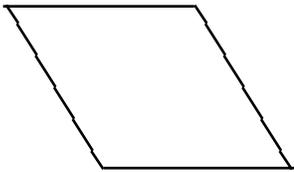
- Have students graph the frequency of the M&M colors.
- Have students name sides and corners (angles) on pattern blocks.
- Have students write word problems related to patterns or the materials used in this unit.

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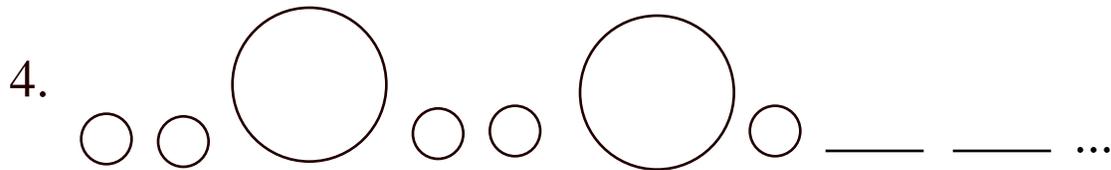
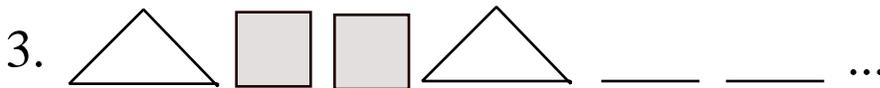
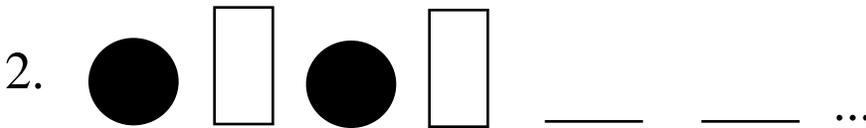
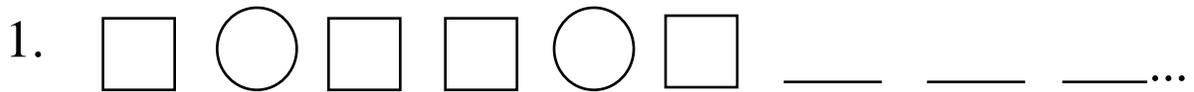
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Template for Pattern Blocks



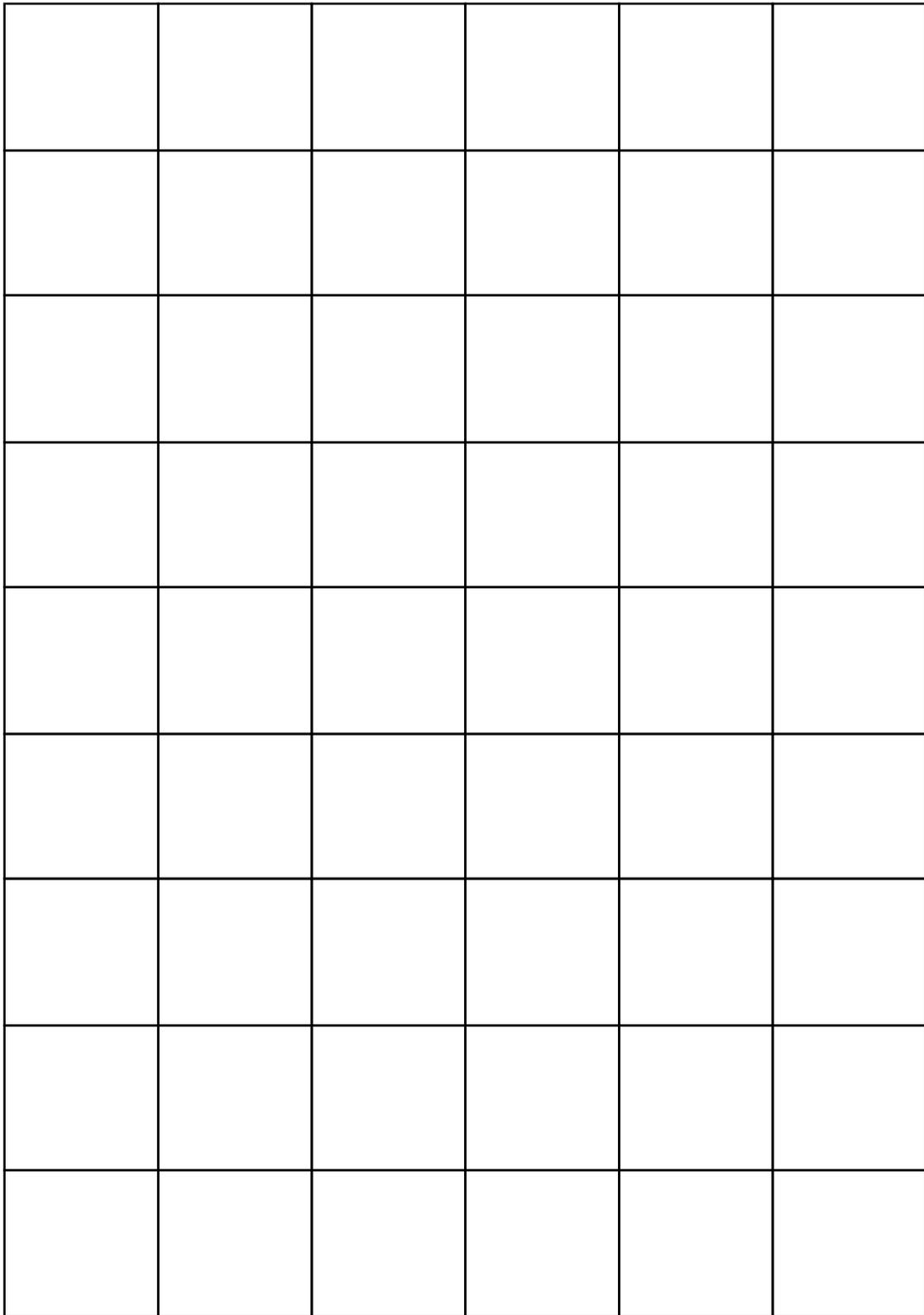
Extending Patterns

Directions: Look at the patterns below. Extend the patterns.



Name _____

Student Resource Sheet 3: Graph Paper



Tile Style

A new addition is going to be built at your school. The designer needs your help to create a pattern for the tile floor. Your class has been chosen to help with the design process. You will create a patterned tile floor. Don't forget that the core of a pattern must repeat! We will have a "Designer Showcase" so that you may exhibit your "tile style!"

Self-Assessment

1. I made a pattern.



2. I can identify the core of my pattern.



3. I can identify the pattern rule of my floor.



4. I repeated the core of my pattern in my tile floor.



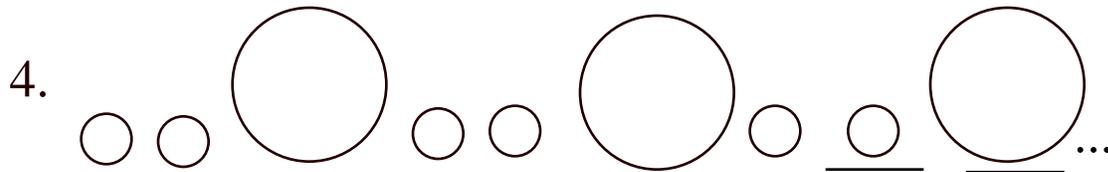
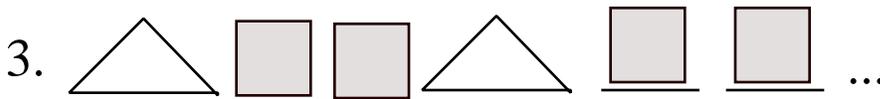
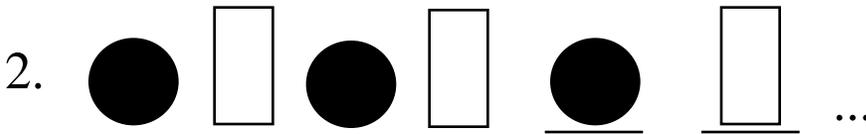
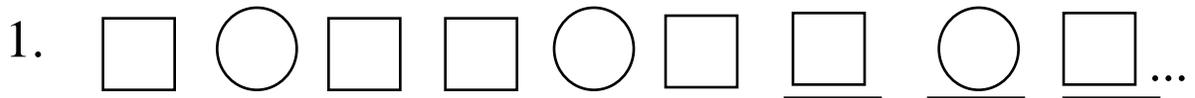
Name _____

Scoring Tool

Score	Identify the Pattern	Create the Pattern	Extend the Pattern	Name the Pattern Rule
3	Consistently identifies patterns.	Consistently creates patterns without assistance.	Consistently extends the pattern without assistance.	Consistently names the pattern rule.
2	Identifies patterns most of the time.	Creates patterns with few errors and little assistance.	Extends the pattern with few errors and little assistance.	Names the pattern rule with few errors and little assistance.
1	Identifies patterns inconsistently.	Creates patterns with many errors. Usually requires assistance.	Extends patterns with many errors. Usually requires assistance.	Unable to name the pattern rule.
0	Unable to identify patterns.	Unable to create patterns.	Unable to extend patterns.	Unable to name the pattern rule.

Extending Patterns: Answer Key

Directions: Look at the patterns below. Extend the patterns.



Name _____